

Appl. No. 10/712,195
Response Dated August 17, 2006
Reply to Office Action Mailed May 19, 2006

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the subject patent application.

Listing of Claims

Claim 1 (currently amended). A system for generation and storage of pressurized hydrogen gas, comprising:

- (a) a hydrogen gas generator which comprises:
 - a first compartment comprising at least one chemical hydride for irreversibly generating pressurized hydrogen gas by a chemical reaction of the at least one chemical hydride; and
- (b) a hydrogen storage canister in fluid communication with the hydrogen gas generator for storing the pressurized hydrogen gas, wherein the hydrogen storage canister comprises at least one metal hydride; and
- (c) at least one hydrogen conditioner in fluid communication with the hydrogen gas generator and the hydrogen storage canister wherein the at least one hydrogen conditioner comprises a vessel which contains one or more desiccant materials.

Claim 2 (canceled).

Claim 3 (canceled).

Claim 4 (canceled).

Claim 5 (currently amended). The system of claim [4] 1, wherein the one or more desiccant materials are selected from the group consisting of zeolites, molecular sieve adsorbents, activated carbon adsorbents, activated alumina adsorbents, silica, CaS, CaCl₂, Ca(SO₄)₂ and mixtures of any two or more of the foregoing.

Claim 6 (previously presented). The system of claim 1, wherein the chemical hydride

Appl. No. 10/712,195
Response Dated August 17, 2006
Reply to Office Action Mailed May 19, 2006

is selected from the group consisting of sodium borohydride, lithium borohydride, sodium aluminum hydride, lithium aluminum hydride, lithium hydride, sodium hydride, calcium hydride, magnesium hydride, aluminum metal, magnesium metal, magnesium/iron alloys and mixtures of any two or more of the foregoing.

Claim 7 (original). The system of claim 1, wherein the at least one chemical hydride is in the form of a solid.

Claim 8 (currently amended). The system of claim 7, wherein the hydrogen gas generator further comprises a second compartment comprising an aqueous solution—or—ammonia.

Claim 9 (previously presented). The system of claim 8, wherein the first compartment and the second compartment are disposed within a single container, and wherein the first compartment is in selective fluid communication with the second compartment.

Claim 10 (original). The system of claim 8, wherein the aqueous solution in the second compartment is at a pressure greater than the pressure of the first compartment.

Claim 11 (original). The system of claim 8, wherein the hydrogen gas generator further comprises at least one promoter.

Claim 12 (original). The system of claim 8, wherein the hydrogen gas generator is capable of generating hydrogen gas having a pressure sufficient to fill a hydrogen storage canister.

Claim 13 (original). The system of claim 8, wherein the hydrogen gas generator is capable of generating hydrogen gas having a pressure of at least about 50 psig.

Claim 14 (canceled).

Appl. No. 10/712,195

Response Dated August 17, 2006

Reply to Office Action Mailed May 19, 2006

Claim 15 (previously presented). The system of claim 8, wherein the at least one metal hydride is of a type selected from the group consisting of AB, AB₂ and AB₅.

Claim 16 (previously presented). The system of claim 1, further comprising a heat exchanger in thermal communication with the hydrogen storage canister.

Claim 17 (original). The system of claim 8, wherein the first compartment is disposed in a first container and the second compartment is disposed in a second container, and wherein the first container is in selective fluid communication with the second container.

Claim 18 (previously presented). The system of claim 1, wherein at least a portion of the at least one chemical hydride is in the form of an aqueous solution.

Claim 19 (canceled).

Claim 20 (previously presented). The system of claim 18, wherein the hydrogen gas generator further comprises at least one promoter.

Claim 21 (previously presented). The system of claim 20, wherein the at least one promoter is in selective fluid communication with the aqueous solution of the at least one chemical hydride.

Claim 22 (canceled).

Claim 23 (canceled).

Claim 24 (previously presented). The system of claim 18, wherein the hydrogen gas generator is capable of generating hydrogen gas having a pressure sufficient to fill a hydrogen storage canister.

Claim 25 (previously presented). The system of claim 18, wherein the hydrogen gas generator is capable of generating hydrogen gas having a pressure of at least about 50 psig.

Claim 26 (previously presented). The system of claim 18, wherein the at least one metal hydride is of a type selected from the group consisting of AB, AB₂ and AB₅.

Claim 27 (previously presented). The system of claim 18, wherein the at least one metal hydride is selected from the group consisting of TiFe metal hydride, Ti_{0.98}Zr_{0.02}V_{0.43}Fe_{0.09}Cr_{0.05}Mn_{1.5} metal hydride and MmNi₅ metal hydride, wherein Mm is a mischmetal.

Claim 28 (canceled).

Claim 29 (canceled).

Claim 30 (currently amended). The system of claim 29 18, wherein the one or more desiccant materials are selected from the group consisting of zeolites, molecular sieve adsorbents, activated carbon adsorbents, activated alumina adsorbents, silica, CaS, CaCl₂, Ca(SO₄)₂ and mixtures of any two or more of the foregoing.

Claim 31 (previously presented). The system of claim 18, further comprising a heat exchanger in thermal communication with the hydrogen storage canister.

Claim 32 (canceled) .

Claim 33 (currently amended). A method for generating and storing pressurized hydrogen gas, comprising the steps of:

- (a) irreversibly generating pressurized hydrogen gas by a chemical reaction of at least one chemical hydride in a hydrogen gas generator; and
- (b) collecting and storing the pressurized hydrogen gas in a hydrogen storage canister comprising at least one metal hydride; and

(c) passing the pressurized hydrogen gas formed in step (a) through a hydrogen conditioner comprising a vessel which contains one or more desiccant materials prior to the step of collecting and storing the pressurized hydrogen gas.

Claim 34 (canceled).

Claim 35 (canceled).

Claim 36 (currently amended). The method of claim 33, wherein the generating step comprises contacting the at least one chemical hydride with ~~a material selected from the group consisting of an aqueous solution and ammonia.~~

Claim 37 (previously presented). The method of claim 33 wherein the generating step comprises heating the at least one chemical hydride.

Claim 38 (previously presented). The method of claim 33 , wherein the generating step further comprises contacting the at least one chemical hydride with a promoter.

Claim 39 (previously presented). The method of claim 33, wherein at least a portion of the at least one chemical hydride is supplied in the form of an aqueous solution.

Claim 40 (canceled).

Claim 41 (previously presented). The method of claim 39, wherein the generating step comprises contacting the at least one chemical hydride with a promoter.